



Asthma Triggers and Flood Cleanup: Protecting Health After Major Storm Events

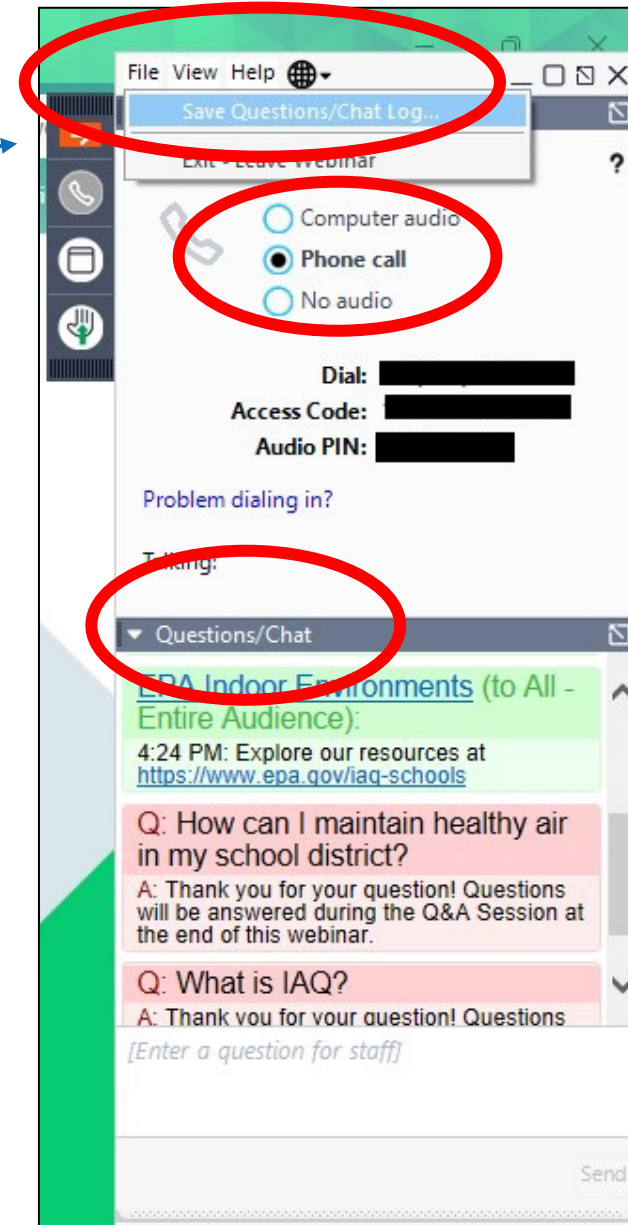


Hosted by the U.S. Environmental Protection Agency (EPA)

March 31, 2026

GoTo Webinar Tips and Tricks

- Use the GoTo Webinar control panel to:
 - **Customize audio options.** The sound will default from your computer speakers, but a phone-in option is also available. This phone line is ***not*** toll-free.
 - *Please note: All participants are in listen-only mode and will be unable to unmute.*
- Use the GoTo Webinar questions/chat pane to:
 - **Submit questions**, comments, and any tech help requests.
 - **View helpful resources** that will be posted there throughout the webinar. To save the chat at the end of the webinar, select “File” and “Save Questions/Chat log”.





Alison Savage, MPH
U.S. EPA, Indoor Environments
Division, Emergency
Preparedness, Response and
Recovery
and Asthma



- I. Welcome and Introductions 5 minutes**
- II. Asthma and Flood Recovery for Indoor Air Quality at EPA..... 15 minutes**
 - A. The Indoor Environment is Critical in Asthma Management*
 - B. Purpose of Today's Webinar*
 - C. Floods, Indoor Air Quality, and Health*
- III. EPA Asthma and Flood Recovery Resources for Indoor Air Quality 5 minutes**
- IV. Speakers: Asthma Triggers and Safe Cleanup Practices After Flood Events..... 25 minutes**
- V. Facilitated Expert Panel Discussion 40 minutes**
- VI. Closing**

Asthma and Flood Recovery for Indoor Air Quality at EPA

The Indoor Environment is Critical in Asthma Management



Framing the Webinar

- Federal asthma guidelines name environmental trigger reduction as critical to comprehensive asthma care.*
- Evidence shows that in-home environmental interventions are effective at improving asthma control.†
- **EPA is a federal lead for integrating environmental risk reduction into standards of asthma care, including in extreme weather events.**

EFFECTIVE IN-HOME ENVIRONMENTAL INTERVENTIONS

Home-Based

- Includes at least one home visit by trained personnel to improve the home environment
- Examples: community health workers, clinicians, health care providers

Multi-Component

- Includes at least two components, including at least one environmental component
- Activities may include asthma-related education, self-management training, environmental assessment and remediation, social services, coordinated care

Multi-Trigger

- Targets two or more potential asthma triggers, including mice, cockroaches, dust mites, excess moisture and mold, household pets, tobacco smoke

* NHLBI. 2020 Focused Updates to the Asthma Management Guidelines. 2021. <https://www.nhlbi.nih.gov/resources/2020-focused-updates-asthma-management-guidelines>

† CDC. *The Guide to Community Preventive Services*. 2005. www.thecommunityguide.org

Purpose of Today's Webinar

- Equip attendees with knowledge, resources, and tools to reduce health risks during flood-related recovery efforts by addressing:
 - How flood-related hazards create health risks for people with asthma and other conditions.
 - Best practices for safe clean-up and recovery.
 - Resources available for households, schools, and community organizations to help in clean-up and education efforts.



Floods, Indoor Air Quality, and Health



Impacts to IAQ and Health

- Hurricanes and storms can lead to flooding.
- Floodwaters can:
 - Make the air in homes unhealthy.
 - Carry sewage and harmful substances.
 - Create conditions favorable for viruses, bacteria, and mold growth, which trigger and exacerbate asthma and allergies, and create health risks for many people.



Floods, Indoor Air Quality, and Health

Flood and Mold Impacts to IAQ and Asthma

- Molds can produce:
 - Allergens
 - Irritants
 - Toxins
- Damp indoor spaces can cause symptoms in individuals with pre-existing asthma.
- Exposure to molds in flooded buildings can make existing asthma worse.
- There is also evidence that damp indoor spaces may cause asthma.



Floods, Indoor Air Quality, and Health



Safe Clean up After a Flood

- Avoiding harmful exposures
 - Chemicals distributed by flood
 - Pesticides
 - Lead and Asbestos
- Safely engaging in flood recovery
- Properly cleaning and drying (or disposing) materials, belongings, etc.



EPA's Flood Recovery Resources for Indoor Air Quality

Floods and IAQ

EPA Resources for Learning and Action



Web Pages

EPA maintains several web pages on flooding and IAQ. This includes guidance for safely cleaning up and recovering a home or building following a flood.

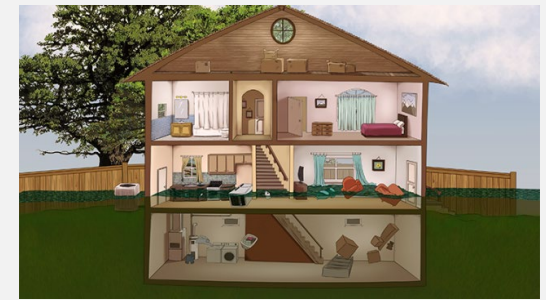
Flood Cleanup for Indoor Air and Health



Flooded Homes Cleanup Guidance

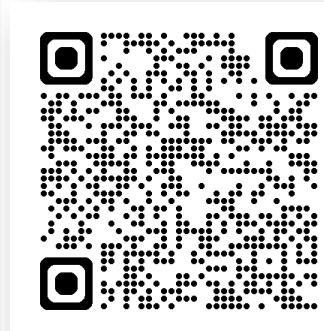
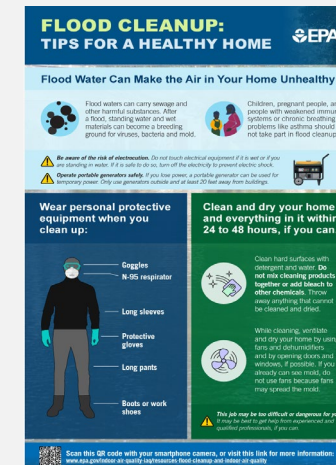
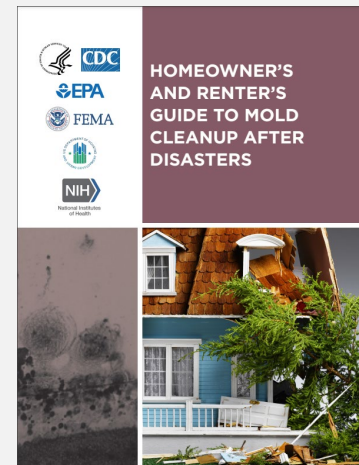


Tour the Interactive Flooded Home



Resources

EPA has a variety of relevant resources, including factsheets, technical guidance, and a series of short videos demonstrating how to safely clean up your home and recover from a flood.



Power Outages and IAQ

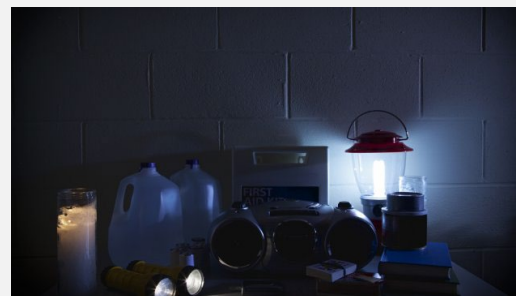
EPA Resources for Learning and Action



Web Pages

EPA maintains several web pages on power outages and IAQ, including on risks from carbon monoxide. Find guidance for safely operating a fuel-powered portable generator, moderating indoor temperatures, and safeguarding occupants from harmful pollutant buildup indoors.

Power Outages and Indoor Air Quality

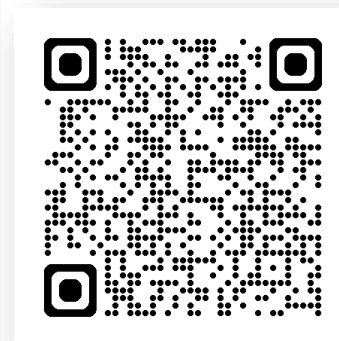
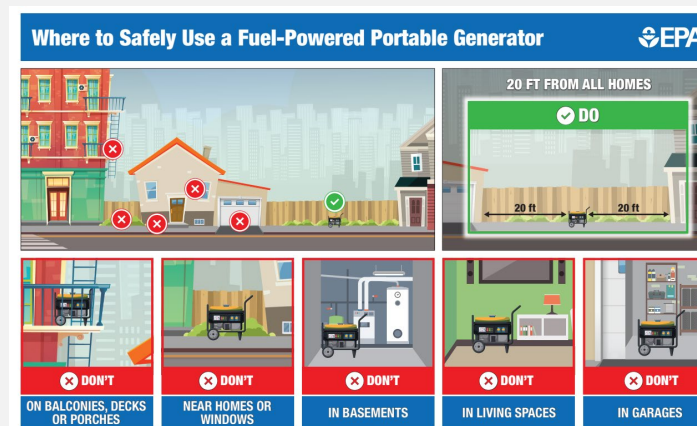


Carbon Monoxide's Impact on IAQ



Resources

EPA has a variety of relevant resources, including infographics, factsheets, and a short video about IAQ impacts of power outages and safely operating a fuel-powered portable generator.



Emergencies and Indoor Air Quality Resources



EPA Resources for Learning and Action

The screenshot shows the EPA website page titled "Resources About Emergencies and Indoor Air Quality". The page features a navigation bar with "Environmental Topics", "Laws & Regulations", "Report a Violation", and "About EPA". A search bar is located in the top right. The main content area includes a sidebar with links to "Indoor Air Quality Home Page", "Emergencies and Indoor Air Quality Home", "Learn About Emergencies and IAQ", "Wildfires", "Floods", "Extreme Heat", "Power Outages", and "Winter Weather". The main heading is "Resources About Emergencies and Indoor Air Quality". Below the heading, there are sections for "On this page:" and "On other pages:". The "On this page:" section lists links for "Flood Cleanup", "Wildfires", and "Power Outages". The "On other pages:" section lists a link for "Federal Partner Resources on Emergencies and Indoor Air Quality". A highlighted section titled "Flood Cleanup and Indoor Air Quality" contains text about mold and health effects from flood water. Below this, there is a section "In this section:" with links for "Flood Publications Resource One-Pager" and "Flood Cleanup Infographic".

The screenshot shows the EPA website page titled "Federal Partner Resources on Emergencies and Indoor Air Quality". The page features a navigation bar with "Environmental Topics", "Laws & Regulations", "Report a Violation", and "About EPA". A search bar is located in the top right. The main content area includes a sidebar with links to "Indoor Air Quality Home Page", "Emergencies and Indoor Air Quality Home", "Learn About Emergencies and IAQ", "Wildfires", "Floods", "Extreme Heat", "Power Outages", and "Winter Weather". The main heading is "Federal Partner Resources on Emergencies and Indoor Air Quality". Below the heading, there are sections for "On this page:" and "On other pages:". The "On this page:" section lists links for "General Information", "Hurricanes and Flooding", "Wildfires", "Extreme Heat", "Power Outages", and "Winter Weather". A red arrow points to the "Hurricanes and Flooding" link. The "On other pages:" section lists a link for "Resources About Emergencies and Indoor Air Quality". A highlighted section titled "General Information" contains links for "Ready.gov" and "CDC - Natural Disasters".

Emergencies and Indoor Air Quality Webpage



Learn more about Emergencies and IAQ (epa.gov/emergencies-iaq)

Wildfires Could Impact Your Indoor Air Quality

During a wildfire, smoke from outdoors can enter your home and make it unhealthy to breathe indoor air.

[Learn about wildfires and IAQ](#)

Wildfires

Find steps that you can take to reduce wildfire smoke in your home and protect your indoor air quality

[Learn about wildfires and IAQ](#)

Floods

Explore guidance on safely cleaning up your home after a flood event to protect your indoor air quality

[Learn about flood cleanup and IAQ](#)

Power Outages

Learn how to protect your indoor air quality during a power outage

[Learn about power outages and IAQ](#)

Extreme Heat

Discover how extreme heat can affect indoor air quality

[Learn about extreme heat and IAQ](#)

Winter Weather

Find winter weather tips for protecting your home and indoor air quality.

[Learn about winter weather and IAQ](#)

Asthma Webpage



Learn more about Asthma and IAQ (epa.gov/asthma)

The screenshot shows the top of the EPA website with the logo and navigation menu. Below the header, the word "Asthma" is prominently displayed. The main content area features a colorful illustration of various asthma triggers like a dog, a cat, and a plant. A text box on the right says "No Asthma" and describes a campaign to help children with asthma. A QR code is visible in the bottom left corner.

This grid contains six cards, each with a title, a brief description, and a call-to-action button:

- Learn about Asthma:** Learn what asthma is and who is at risk. [Learn about asthma](#)
- Manage Asthma Triggers:** Read about how to reduce your exposure to indoor allergens and irritants that can trigger asthma attacks. [Manage asthma triggers](#)
- Take Action on Asthma:** Learn about organizations promoting asthma awareness and how you can help spread the word in your community. [Take action on asthma](#)
- National Asthma Awards:** Read about past winners and how your organization can apply for recognition. [Learn about the awards](#)
- Access Asthma Resources:** Explore publications for kids, parents, caregivers and healthcare professionals. [Access asthma resources](#)
- Asthma Community Network:** Join this network to help your asthma program learn effective strategies, connect with other programs and grow. [Join the network](#)

Join our Subscriber Lists



EPA's Asthma and IAQ Subscriber List

U.S. Environmental Protection Agency
Indoor Environments Division



Indoor Air Quality

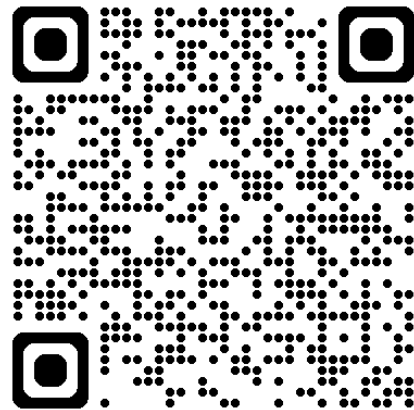
**It's Time for Spring Cleaning, but
Don't Forget about Your Indoor Air
Quality!**



Spring is here and we're ready to throw open the windows, let in some fresh air and begin our spring cleaning! But did you know, the way we clean can impact our indoor air – especially for those with asthma and allergies?

[Asthma triggers](#) are things that can cause asthma symptoms, an episode or attack or make asthma worse. A few simple steps may help reduce your asthma and allergen symptoms when cleaning your home.

Subscribe Here



EPA's Emergencies and IAQ Subscriber List

U.S. Environmental Protection Agency
Indoor Environments Division



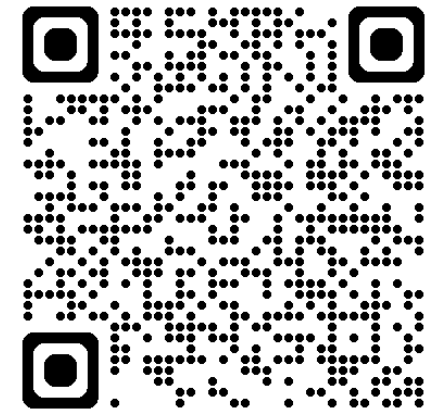
Emergencies and Indoor Air Quality

**Protect Your Indoor Air from Wildfire
Smoke**

Wildfire smoke is impacting large portions of the Western United States. Use the [AirNow Fire and Smoke Map](#) to see the impact on your air quality.



Subscribe Here



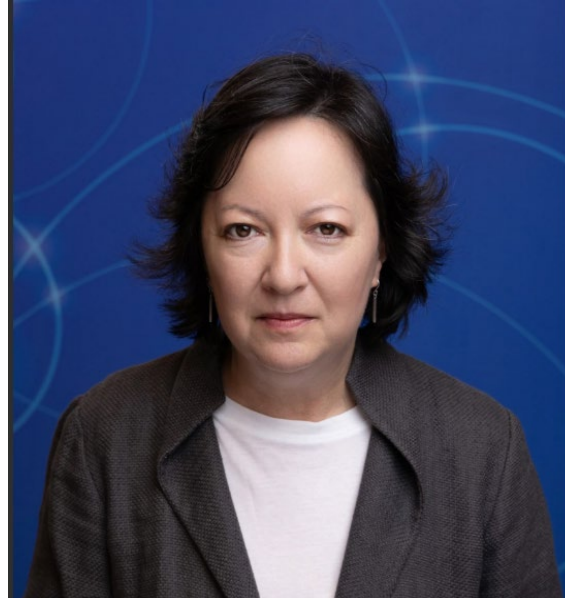
Introducing Our Speaker-Panelists

Facilitated Expert Panel Discussion



Felicia Rabito, PhD, MPH

Professor of Immunology & Interim Chair,
Department of Environmental Health Sciences,
Celia Scott Weatherhead School of Public
Health and Tropical Medicine, Tulane University



Ginger Chew, ScD, MSPH

Senior Scientific Advisor for the Division of
Environmental Health Science & Practice (DEHSP)
Centers for Disease Control and Prevention (CDC)
National Center for Environmental Health (NCEH)



Addison Houston, MCRP, AICP

Climate Adaptation Strategist for
Public Health – Seattle & King County
Climate & Health Equity Initiative
Emergency Response Coordinator for PHSKC's
Environmental Health Services Division

Health Risks of Flood Cleanup in Residential Settings

Felicia A. Rabito, PhD MPH

Interim Chair, Department of Environmental Health Sciences

Professor, Department of Epidemiology

Celia Scott Weatherhead School of Public Health and Tropical Medicine

Tulane University



Flooded homes lead to complex exposure environments.

Cleanup represents a significant, yet underappreciated, exposure potential.



Exposures of concern

- Biologic contaminants
 - Mold spores – rapid proliferation
 - Bacteria – sewage-associated enteric pathogens
 - Endotoxins (released from bacteria)
 - Allergens (pests, dust mites, animal dander) stirred up during cleaning
- Particulate matter
 - Dust, drywall, debris in general
 - Fiberglass particles from insulation
- Chemical contaminants
 - Cleaning chemicals (bleach ammonia, disinfectants)
 - Pesticides



Specific concerns

- Respiratory
 - Asthma exacerbations
 - Respiratory infections
 - Allergic rhinitis and sinusitis, bronchitis
- Increased hospitalization
 - Respiratory diseases
 - Skin conditions
- Emerging evidence of neurologic symptoms



Cleanup represents a significant exposure potential.

Driven by exposure to a mix of biological, chemical and particulate hazards.

Leading to a myriad of health effects.

EXPOSURE

Mold, Bacteria
Particulate Matter
Chemicals



MECHANISM

Airway Inflammation
Oxidative Stress
Immune Activation
Neuroinflammatory
signaling



OUTCOME

Asthma
Respiratory symptoms
Skin/eye Irritation
Neurologic



Real-world Experiences Addressing Flood-related Risks

Ginger L. Chew, Sc.D.

Senior Scientific Advisor, Division of Environmental Health Science and Practice

Webinar hosted by the U.S. Environmental Protection Agency (EPA)

March 31, 2026



Typhoon Mawar (2023)



Photo by Ginger Chew



Photo by Ginger Chew



Photo by Ginger Chew



Photo by Ginger Chew



Photo by Ginger Chew

Hurricane Helene (2024)



Photo by Ginger Chew



Photo by Ginger Chew



Photo by Lynda Neal

Hurricane training (2026)



Photo by Lynda Neal

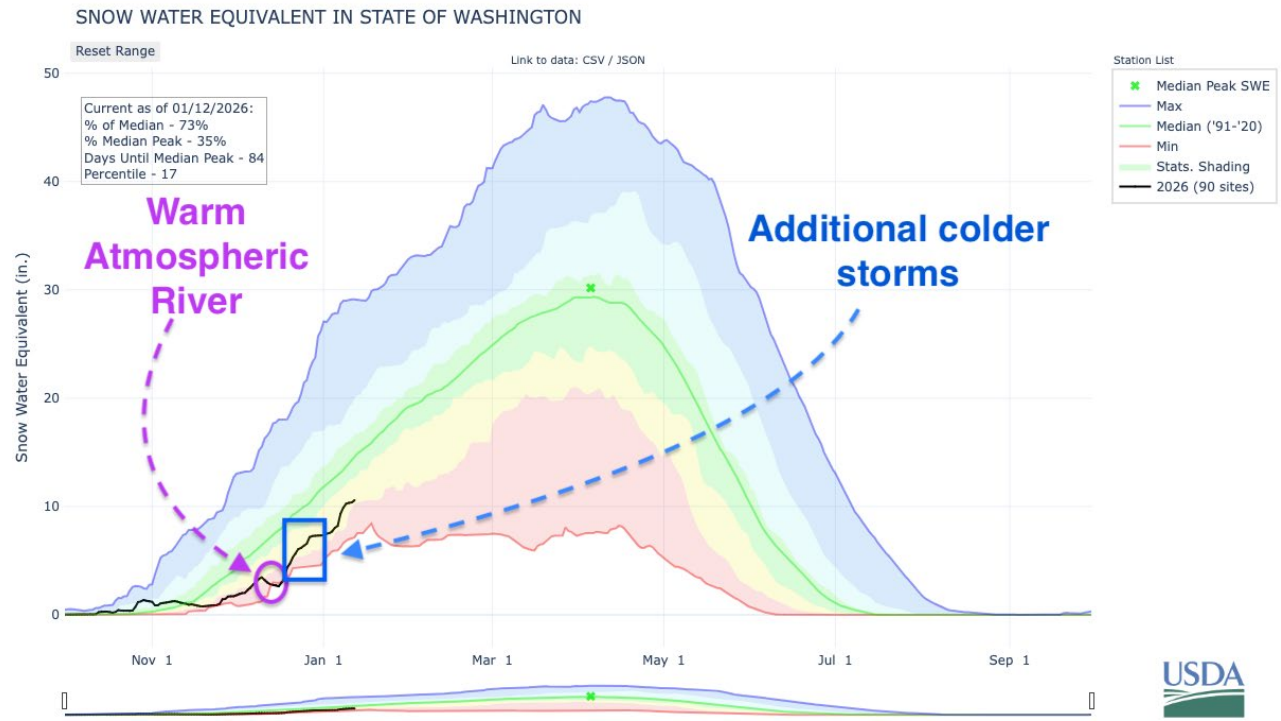
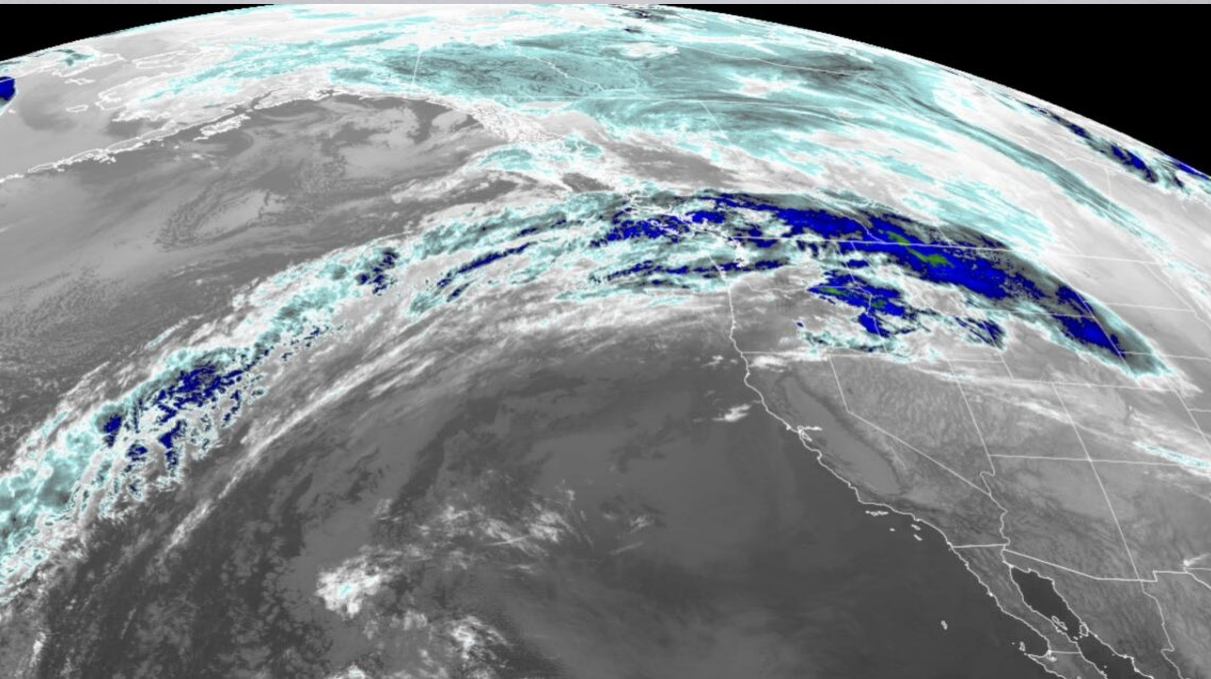
Thank you

For more information, contact NCEH
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov
Follow us on Twitter @CDCEnvironment

The findings and conclusions in this presentation have not been formally disseminated by [the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry] and should not be construed to represent any agency determination or policy.



Washington 2025 Atmospheric River & Flood Event



Public Health
Seattle & King County



Public Health – Seattle & King County flood recovery guidance & risk communications:

- Health safety information[†]
- Proper use of PPE[†]
- What to keep and what to throw away[†]
- Tips for mold clean-up (*source: CDC*)[†]
- How to clean a basement after a flood[†]
- Lead safety
- Asbestos safety
- What to do if you have a rat in your toilet[†]
- Soil & garden safety after a flood
- Flood response for food businesses

[†] guidance available in multiple languages

www.kingcounty.gov/health/flood



Observations:

- Flooding offered a **preview of the significance of hydrological regime shifts** associated with climate change. (e.g., change from mountain snow to high elevation rainfall with increasing temperatures)
- **Natural flowing rivers quickly peaked and dropped below flood levels, while managed river systems remained at or above flood stage** for prolonged period, attributing to levee breaches and failures.
- **Gaps remain associated with:**
 - Residential awareness of flood risk along managed rivers
 - Home assessments following inundation
 - Sampling and monitoring for migration of contaminants due to flooding



Asthma Triggers and Flood Cleanup

Facilitated Expert Panel Discussion



Thank You for Attending!